



Ice core records of regional sea ice changes around Antarctica during the 20th century

N.J. Abram (1), J. McConnell (2), R. Mulvaney (1), E.W. Wolff (1)

(1) British Antarctic Survey, Natural Environment Research Council, Cambridge, U.K., (2) Desert Research Institute, Division of Hydrologic Sciences, Nevada, U.S.A.

(nabr@bas.ac.uk / Phone: +44-1223-221539)

Sea ice around Antarctica plays a crucial role in modulating regional climate, ocean circulation and ecosystem productivity. Records of Antarctic sea ice generally extend back only a few decades, and hence there is a need to develop proxy records of Antarctic sea ice so that this sector of the climate system can be more accurately incorporated into climate models. It has been suggested that Antarctic ice core records of methane-sulphonic acid (MSA; a chemical compound that is ultimately derived from marine productivity at the sea ice margin) could provide a sea ice proxy, however early work on testing this proxy in individual ice cores has produced varying results. To help resolve these early findings we examine ice core MSA records from an extensive network of near-coastal sites around Antarctica. We find that ice core MSA records are best viewed as a local to regional scale proxy for sea ice. The ice core MSA records show strong variability at interannual to decadal scales, however the factors dominating this variability clearly differ from region to region around Antarctica. The ice core network of MSA records also suggests that there were large regional differences in the timing and extent of long-term changes in Antarctic sea ice during the 20th century. This is in agreement with regional differences in sea ice trends suggested by early whaling records and sea ice charts, and suggests that networks of ice core MSA records do have the potential to improve our understanding of the characteristics and drivers of past sea ice changes around Antarctica.